DRAFT

ENGINEERING EVALUATION
City of Alameda
PLANT NO. 16411
APPLICATION NO. 10731

BACKGROUND

The City of Alameda, California is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

S-1 Stationary Standby Generator Set: Diesel Engine; Make: Cummins; Model: QSM-11G2; Rated Horsepower: 470 HP

The standby generator will be located at a lot on the corner of Tinker Avenue and Coral Sea, Alameda, CA 94501.

EMISSIONS SUMMARY

Annual Emissions:

The CARB certified emission factors for S-1 (470 HP- diesel engine) are listed below:

Pollutant	Emission Factors (g/hp-hr)
	S-1
NOx	3.95
CO	0.75
POC	0.20
PM10	0.10
SO_2*	0.184*

**The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*

SO_2 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (454 g/lb) = 0.184 g/hp-hr

NOx	=	(3.95 g/hp-hr)	(470 hp)	(100 hr/yr)	(lb/454g)	=	409 lb/yr	= 0.205 TPY
CO	=	(0.75 g/hp-hr)	(470 hp)	(100 hr/yr)	(lb/454g)	=	77.2 lb/yr	= 0.039 TPY
POC	=	(0.20 g/hp-hr)	(470 hp)	(100 hr/yr)	(lb/454g)	=	20.8 lb/yr	= 0.010 TPY
PM10	=	(0.10 g/hp-hr)	(470 hp)	(100 hr/yr)	(lb/454g)	=	10.8 lb/yr	= 0.005 TPY
SO2	=	(0.184 g/hp-hr)	(470 hp)	(100 hr/yr)	(lb/454g)	=	19.0 lb/yr	= 0.010 TPY

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.
For S-1:

NOx	=	(3.95 g/hp-hr)	(470 hp)	(24 hr/day)	(lb/454g)	=	98.2 lb/day
CO	=	(0.75 g/hp-hr)	(470 hp)	(24 hr/day)	(lb/454g)	=	18.5 lb/day
POC	=	(0.21 g/hp-hr)	(470 hp)	(24 hr/day)	(lb/454g)	=	5.19 lb/day
PM10	=	(0.10 g/hp-hr)	(470 hp)	(24 hr/day)	(lb/454g)	=	2.59 lb/day
SO2	=	(0.184 g/hp-hr)	(470 hp)	(24 hr/day)	(lb/454g)	=	4.57 lb/day

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New	Total
NOx	0	0.205	0.205
CO	0	0.039	0.039
POC	0	0.010	0.010
PM10	0	0.005	0.005
SO2	0	0.010	0.010
NPOC	0	0.000	0.000

Toxic Risk Screening:
The toxic emission of diesel particulate exceeds the District Risk Screening Trigger, as shown in Table (1) below, and a Risk Screening Analysis has been performed.

Table 1. Calculated incremental increase in diesel exhaust particulate matter for S-1

Source:	PM_{10} Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)[1]	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.10	470	100	10.8	0.64	Yes

Per the attached 9/29/2004 memo from Marc Nash, results from the health risk screening analysis indicate that the cancer risk for the maximally exposed receptor is 0.6 in a million for 100 hours of operation per year, excluding periods when operation is required due to emergency conditions. Thus, in accordance with the District's Toxic Risk Management Policy, the screen passes.

The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations. Stack and building parameters for the analysis were based on information provided by the applicant. Estimates of residential risk assume continuous 70-year exposure to annual average TAC concentrations, and estimates of industrial risk assume that an off-

[1] Annual Usage based on 100 hours per year of operation for reliability-related activities as defined in Regulation 9-8-330 ("Emergency Standby Engines, Hours of Operations").

site worker is exposed 46 years out of a 70-year lifetime. For students, the assumptions include higher breathing rates and exposures of 36 weeks over a 9-year period.

PUBLIC COMMENT

The project is within 1000 feet of a public school and therefore subject to the public notification requirements of Reg. 2-1-412. The public notice will be posted on the Internet and mailed to all Parents or Guardians with children enrolled at George P. Miller Elementary School. It will also be mailed to all residential neighbors located within 1000 feet of the proposed new source of pollution.

STATEMENT OF COMPLIANCE

The owner/operator of S-1 shall comply with Reg. 6 (Particulate Matter and Visible Emissions Standards) and Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). Since this engine meets TBACT for PM10 (<0.15 g/hp-hr), it is expected to comply with Reg. 6. Low sulfur diesel (0.05wt%) will be used to meet the sulfur limitation of 0.5wt% in Reg. 9-1-304. Because S-1 is an emergency standby generator, Reg. 9-8-110 (Inorganic Gaseous Pollutants: Nitrogen Oxides from Stationary Internal Combustion Engine) exempts the requirements for emission limits of Sections 9-8-301, 302, and 502. Allowable operating hours and the corresponding record keeping in Reg. 9-8-330 and 530 will be included in the Permit Conditions below.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3)

Best Available Control Technology:
In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO_2 or PM_{10}.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutants: NOx and CO. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to the meet BACT 2 limits presented on the next page.

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
NOx	1. *1.5 g/bhp-hr [107 ppmvd @ 15% O_2] [a,b]* 2. *6.9 g/bhp-hr [490 ppmvd*	1. *Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler [a,b]* 2. *Timing Retard ≤ 4º + Turbocharger w/*

	@ 15% O_2] a,b,c *3. 6.9 g/bhp-hr [490 ppmvd @ 15 % O_2]*	*Intercooler a,b,c* 3. *Timing Retard ≤ 4º + Turbocharger w/ Intercooler*
CO	1. *n/s* 2. *2.75 g/bhp-hr [319 ppmvd @ 15% O2] b,c*	1. *Catalytic Oxidation b* 2. *CARB or EPA (or equivalent) low-CO emitting certified engine b,c*

The NOx and CO emission limits set by BACT 2 are met, as shown in Table (2).

Table (2)

Pollutant	Engine Emission Factors (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
NOx	3.95	6.9	YES
CO	0.75	2.75	YES

Since CARB certification data was used to establish the NOx and CO emission factor, the BACT 2 emission limits have not been incorporated into the permit conditions and are assumed to be in compliance through the design standards demonstrated by the CARB certification testing.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 15 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Conditions for S-1 Stationary Standby Generator
Application #10731, Plant #16411, The City of Alameda:

PC 19533

1. Hours of Operation: The owner/operator shall operate the emergency standby engine(s) only to mitigate emergency conditions or for reliability-related activities. Operating while mitigating emergency conditions is unlimited. Operating for reliability-related activities is limited to 100 hours per any calendar year. [Basis: Regulation 9-8-330]

   "Emergency Conditions" is defined as any of the following:
   a. Loss of regular natural gas supply.
   b. Failure of regular electric power supply.
   c. Flood mitigation.
   d. Sewage overflow mitigation.
   e. Fire.

f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.

[Basis: Regulation 9-8-231]

"Reliability-related activities" is defined as any of the following:

a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
b. Operation of an emergency standby engine during maintenance of a primary motor.

[Basis: Regulation 9-8-232]

2. The owner/operator shall equip the emergency standby engine(s) with either:
   a. a non-resettable totalizing meter that measures the hours of operation for the engine; or
   b. a non-resettable fuel usage meter, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.

   [Basis: Regulation 9-8-530]

3. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 2 years and shall make the log available for District inspection upon request:
   a. Hours of operation (total).
   b. Hours of operation (emergency).
   c. For each emergency, the nature of the emergency condition.
   d. Fuel usage for engine(s) if a non-resettable fuel usage meter is utilized.

   [Basis: Regulations 9-8-530 and 1-441]

RECOMMENDATION

Issue an Authority to Construct to The City of Alameda for:

S-1 Stationary Standby Generator Set: Diesel Engine; Make: Cummins; Model: QSM-11G2; Rated Horsepower: 470 HP

EXEMPTIONS

None.

By:_____ Date:_____

Roy Lo
Air Quality Engineering Intern